

Incidence of neurological complications following placement of epidural and caudal catheters in anesthetized children for post-operative analgesia.

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Introduction: It is well known that regional anesthesia is safe and effective for post-operative pain control in adults (1). However, few studies regarding the safety of placing neuraxial catheters in anesthetized adults exist in the current literature (2), and even fewer concern regional anesthesia in anesthetized children (3). Therefore, we have designed a retrospective analysis of all epidural catheters placed in anesthetized children at our institution since December 2001 in order to determine the incidence of neurological complications from a practice that includes routine placement of epidural catheters at the caudal, lumbar, and thoracic levels.

Methods: After Institutional Review Board approval for waiver of informed consent, 676 patients with epidural catheters for post-operative analgesia were identified from The Children's Hospital Of Philadelphia Pain Management Database since its inception in December 2001 through the end of November 2003. All database entries for either epidural or caudal catheter placement were reviewed for age, gender, weight, and duration of catheter use. Individual patient charts were reviewed to confirm placement of catheters while under general anesthesia; the sites of needle placement as well as occurrence of all complications were recorded. Charts were excluded from analysis if the catheters were not placed under general anesthesia, if the catheters were not placed centrally, or if the data to be recorded were incomplete.

Results: 676 catheters were placed in 670 patients, of which 366 (54.6%) were males and 310 (46.3%) were females. The mean age was 7.58 years, ranging from the first day of life through 54 years old. The average weight was 28.66 kg, ranging from 1.28 kg to 121 kg. Preliminary results from the first 396 individual charts are reported. There were 82 exclusions made for reasons noted above. Of the first 314 eligible cases, 91 (29.0%) catheters were inserted in the thoracic region, 99 (31.5%) in the lumbar region, and 117 (37.3%) in the caudal space. A total of 166 (52.9%) patients had no reported side effects, 132 (42.0%) had miscellaneous side effects, and 21 (6.7%) had side effects requiring assessment for neurological sequelae. The most prevalent miscellaneous side effects were pruritis, nausea/ emesis, or pain requiring medication adjustment; all cases were resolved without sequelae. The mean duration of catheter use was 3.91 days, ranging from 1 to 40 days. All 21 patients with side effects indicating a potential neurological complication had complete resolution of symptoms without sequelae. There were no incidences of epidural abscess or spinal hematoma. The neurological side effects reported included 5 (1.6%) cases of motor block or weakness, 4 (1.3%) cases of localized site infection, 4 (1.3%) cases of muscle spasm or myoclonus, 3 (0.96%) cases of mental status changes, 3 (0.96%) episodes of nonspecific headache, 1 (0.32%) case of post-dural puncture headache, 1 (0.32%) case of Horner's syndrome, 1 (0.32%) case of hysterical paralysis, and 1 (0.32%) case of dysesthesia. All of the above resolved with appropriate interventions. Motor block and Horner's syndrome were treated with a reduction in bupivacaine concentration and/or infusion rate. Removal of epidural catheters and topical antibiotic administration were utilized for the site infections. Valium successfully treated the muscle spasms. The mental status changes and headaches resolved with supportive treatment. The patient with hysterical paralysis had the epidural catheter removed, followed by a normal MRI examination and consultation by both neurological and psychiatric services; symptoms resolved after psychological counseling. The only true neurological complication, dysesthesia, resolved with partial withdrawal of the epidural catheter. The remaining 280 charts are currently undergoing analysis.

Discussion: Retrospective review of our Pain Database reveals that miscellaneous side effects occurred in approximately 42% of patients, a great majority of which were easily treated with intravenous medications, medication adjustment, or abandonment of the regional anesthesia technique. Analysis of the 6.7% of patients with concern for possible neurological side effects revealed only one true neurological complication. This results in an incidence of 0.32% for transient neurological complications, with no permanent neurological complications. In conclusion, our retrospective review of less than 700 children with thoracic, lumbar, and caudal catheters placed under general anesthesia for post-operative analgesia demonstrates a very low risk of neurological complications. A larger prospective study is planned to further support these data.

References:

1. Auroy Y. et al., *Anesthesiology* 1997.
2. Horlocker T.T. et al., *Anesthesia and Analgesia* 2003.
3. Giaufre E. et al., *Anesthesia and Analgesia* 1996.